US007941207B2

US0079412007B2

(12) **United States Patent**　　(10) **Patent No.:**　**US 7,941,207 B2**

Korzinov　　(45) **Date of Patent:**　*May 10, 2011

(54) **CARDIAC MONITORING**

(75) Inventor: **Lev Korzinov**, San Diego, CA (US)

(73) Assignee: **CardioNet, Inc.**, San Diego, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1104 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **11/674,053**

(22) Filed: **Feb. 12, 2007**

(65) **Prior Publication Data**

US 2007/0129642 A1　　Jun. 7, 2007

Related U.S. Application Data

(63) Continuation of application No. 10/762,887, filed on Jan. 21, 2004, now Pat. No. 7,194,300.

(51) **Int. Cl.**
A61B 5/04　　　(2006.01)

(52) **U.S. Cl.** **600/518**

(58) **Field of Classification Search** 600/509–521; 607/25

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,621,617	A	*	11/1986	Sharma	.... 600/16
4,622,979	A		11/1986	Katchis et al.	
4,630,204	A		12/1986	Mortara	
4,920,489	A		4/1990	Hubelbank et al.	
4,938,228	A		7/1990	Righter et al.	
4,951,681	A		8/1990	Mortara	
4,958,641	A		9/1990	Digby et al.	

4,977,899	A		12/1990	Digby et al.
D326,716	S		6/1992	Mortara
5,191,891	A		3/1993	Righter
5,197,479	A		3/1993	Hubelbank et al.
5,226,425	A		7/1993	Righter
5,365,935	A		11/1994	Righter et al.
5,421,342	A		6/1995	Mortara
5,423,863	A		6/1995	Felblinger et al.
5,456,261	A		10/1995	Luczyk
5,490,515	A		2/1996	Mortara
5,522,396	A		6/1996	Langer et al.
5,546,950	A		8/1996	Schoeckert et al.

(Continued)

FOREIGN PATENT DOCUMENTS

JP　　　10-234688　　　9/1998

(Continued)

OTHER PUBLICATIONS

Biomedical Computer Laboratory, Institute for Biomedical Computing, Washington University, "Progress Report No. 21," Jul. 1, 1984-Jun. 30, 1985, 164 pages.

(Continued)

Primary Examiner — George Manuel
(74) *Attorney, Agent, or Firm* — Fish & Richardson P.C.

(57)　　　　**ABSTRACT**

Systems and techniques for monitoring cardiac activity. In one aspect, a method includes collecting information describing the variability in heart rate over a series of beats, designating variability at a lower end of physiological values as being largely irrelevant to atrial fibrillation, designating variability in a midrange of physiological values as being indicative of atrial fibrillation, designating variability in an upper range of physiological values as being negatively indicative of atrial fibrillation, and determining a relevance of the variability described in the collection to atrial fibrillation.

25 Claims, 7 Drawing Sheets